

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

1. (currently amended) A polypeptide comprising a Tn5 transposase mutant modified relative to a ~~wild-type Tn5 transposase~~ SEQ ID NO:2, the transposase mutant comprising a mutation at position 54 of SEQ ID NO:2, a mutation at position 242 of SEQ ID NO:2, and a mutation at position 372 of SEQ ID NO:2, wherein the transposase mutant has greater avidity than wild-type Tn5 transposase for at least one of a Tn5 outside end sequence as defined by SEQ ID NO:3 and a modified Tn5 outside end sequence as defined by SEQ ID NO:5.
2. (original) A polypeptide as claimed in claim 1 wherein the mutation at position 54 of the Tn5 transposase mutant is a substitution mutation.
3. (original) A polypeptide as claimed in claim 2 wherein position 54 of the Tn5 transposase mutant is a lysine.
4. (original) A polypeptide as claimed in claim 2 wherein position 54 of the Tn5 transposase mutant is a valine.
5. (original) A polypeptide as claimed in claim 1 wherein the mutation at position 372 of the Tn5 transposase mutant is a substitution mutation.
6. (original) A polypeptide as claimed in claim 5 wherein position 372 of the Tn5 transposase mutant is a proline.
7. (original) A polypeptide as claimed in claim 5 wherein position 372 of the Tn5 transposase mutant is a glutamine.
8. (original) A polypeptide as claimed in claim 1 wherein the mutation at position 242 of the Tn5 transposase mutant is a substitution mutation.

9. (original) A polypeptide as claimed in claim 8 wherein position 242 of the Tn5 transposase mutant is an amino acid selected from the group consisting of alanine, glycine, valine, leucine, isoleucine, tyrosine, phenylalanine, and aspartic acid.

10. (currently amended) A polypeptide as claimed in claim 1 wherein the Tn5 transposase mutant further comprises a substitution mutation at position 56 of SEQ ID NO:2, wherein the transposase mutant lacks an inhibitor activity.

11. (original) A polypeptide as claimed in claim 10 wherein position 56 of the Tn5 transposase mutant is an alanine.

12. (currently amended) A Tn5 transposase mutant modified relative to ~~a wild-type Tn5 transposase~~ SEQ ID NO:2, the transposase mutant comprising a mutation at position 54 of SEQ ID NO:2, a mutation at position 242 of SEQ ID NO:2, and a mutation at position 372 of SEQ ID NO:2, wherein the transposase mutant has greater avidity than wild-type Tn5 transposase for at least one of a Tn5 outside end sequence as defined by SEQ ID NO:3 and a modified Tn5 outside end sequence as defined by SEQ ID NO:5.

13. (original) A nucleic acid comprising a polynucleotide that encodes the Tn5 transposase mutant as claimed in claim 12.

14. (original) A nucleic acid as claimed in claim 13 further comprising a transcriptional control sequence operably linked to the polynucleotide that encodes the Tn5 transposase mutant.

15. (original) A host cell comprising a nucleic acid as claimed in claim 13.

16. (original) A system for transposing a transposable DNA sequence *in vitro*, the system comprising:

the polypeptide of claim 1;

a donor DNA molecule comprising the transposable DNA sequence, the transposable DNA sequence being flanked at its 5'- and 3'-ends by sequences selected from the group consisting of a wild-type Tn5 outside end sequence and a modified Tn5 outside end sequence that is active for *in vitro* transposition; and

a target DNA molecule into which the transposable DNA sequence can transpose.

17. (currently amended) A method for *in vitro* transposition, the method comprising the steps of:

combining a donor DNA molecule that comprises a transposable DNA sequence of interest with a target DNA molecule and the polypeptide of claim 1 in a suitable reaction buffer for a period of time sufficient for the enzyme to catalyze *in vitro* transposition, wherein the transposable DNA sequence of interest is flanked at its 5'- and 3'- ends by a pair of ~~outside end~~ sequences selected from the group consisting of a wild-type Tn5 outside end sequence and modified Tn5 outside end sequences that are active for *in vitro* transposition.

18. (currently amended) A method for *in vitro* transposition in a genetic construct that comprises a transposable portion and a donor backbone portion, the transposable portion comprising an origin of replication, a nucleotide sequence of interest, and a pair of ~~outside end~~ sequences flanking the donor backbone portion, the pair of outside end sequences being selected from the group consisting of a wild-type Tn5 outside end sequence and modified Tn5 outside end sequences that are active for *in vitro* transposition, the method comprising the steps of:

combining, in an *in vitro* reaction mix, the polypeptide of claim 1 and the genetic construct at a ~~low~~ concentration suitable for generating intramolecular transposition, to generate reaction products;

transforming the reaction products into a host cell;

proliferating the host cell to generate multiple transformed cells; and

selecting from among the multiple transformed cells for cells that comprise (i) a DNA molecule that has lost the donor backbone portion and ~~that comprise (ii)~~ a transposition of the nucleotide sequence of interest.

19. (currently amended) A method for forming a synaptic complex between (a) the polypeptide of claim 1 and (b) a polynucleotide that comprises a pair of ~~outside end~~ sequences and a transposable nucleotide sequence therebetween, wherein the pair of ~~outside~~ sequences are selected from the group consisting of a wild-type Tn 5 outside end sequence and modified Tn5 outside end sequences that are active for *in vitro* transposition, the method comprising the step of:

combining (a) and (b) *in vitro* under conditions that disfavor polynucleotide strand transfer to form the synaptic complex.

20. (currently amended) A method for making an insertional mutation ~~at a random or quasi-random position~~ in cellular nucleic acid in a target cell, the method comprising the step of:

introducing into the target cell a synaptic complex according to claim 19 under conditions that mediate transpositions into the cellular nucleic acid.